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## THE COCKROACH AND ITS ENEMY.

BY G. A. PERKINS, M. D.

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THE instinctive habits of insects furnish no small proportion of the interest which attaches to the study of that class of the animal kingdom. The wasps furnish their full share, and the student of nature never tires of investigating the different methods by which they arrive at the same end,—each species following out the law impressed upon it by the Creator with its very being.

The various species of *Vespa* deposit their eggs in a paper cell, and feed their young, in a larval stage, with insects, which they chew, and partially digest for this purpose. Another genus (*Pompilus*) excavates a hole in the sand in which she deposits numbers of flies, spiders, etc., and with them an egg, and, burying them, leaves the larva to select its own food from these materials. Others, such as *Pelopæus*, the Mud-dauber, places the same materials in curiously constructed cells of clay, and closes them up with the same masonry. Others still, not content with such small game, select the body of one of the larger insects, and deposit in it the germ of their future offspring.

Of this latter class is a beautiful trig little species (*Ampulex Sibirica* Fabr.), very common in Western Africa, and whose polished metallic body, shining like burnished steel, is familiar to all dwellers on that coast. The *Ampulex* selects the body of the gigantic Cockroach as the receptacle of its egg, and it is not a little amusing to see in what a business-like and determined manner she sets herself to the task of capturing her victim, and serv-

ing her writ of *habeas corpus* upon the doomed roach, full a dozen times her size.

The wasp enters the apartment, and instantly a great commotion takes place among the cockroaches (and their name is legion in the tropics); frantic with fear, they seek a place of greater security, and, in their haste, often rush into the very danger they seek to avoid; for, should the keen eye of the wasp light upon them, the case is a hopeless one. (It is a matter of wonder in what manner the roach should know of the presence of the wasp, and we can only conjecture that its keen perception may distinguish a peculiar sound in the vibrations of the wings of its enemy, as the larger animals are said to in the roaring of the lion.) The wasp flies like a fury at the roach, and a severe struggle takes place; both using legs and wings in the fight, the contest is usually a short one, for the wasp, seizing its victim by the head, or front of the thorax, bends its body short round and plunges its sting into the nearest part, and the roach, who a moment before was fighting for dear life, becomes as quiet as a sleeping infant,—not a leg moves. The victorious wasp draws off a few inches, seeming to survey her vanquished foe with pride, then proceeds to brush off the dust from its brilliant coat and wings, and, after pluming its antennæ, prepares to place its prize in a secluded spot. Taking the roach by the head, she leads him away a few feet, and, leaving him, examines the vicinity for this purpose. In one instance, the cockroach was dragged with considerable trouble between the leaden lining of a tea-chest and the outer box; in another, an open-backed book answered her purpose; but the most singular spot was the inside of a door-lock. The cockroach walked slowly up the door to the key-hole, led by the wasp, and, after

much pulling on the part of the wasp, was forced into the interior. After being out of sight a few minutes, the wasp returned, took several nails from a paper which lay on the floor near by, and carried them, one by one, into the key-hole. I could not but admire the perseverance manifested in this effort. The wasp was obliged to walk backwards up the door to the key-hole; the nail could not be turned by the wasp into a proper position to enter endwise, and, consequently, fell to the floor several times before being successfully drawn in, and each time the wasp descended immediately to renew the attempt. The lock was taken off carefully, and *six four-penny nails* found covering the body of the roach.

Not the least singular feature in the case is, that the sting of the wasp does not kill the cockroach, but only stupefies him, so that the roach, when he walks to his final resting-place, may certainly be said to *go to his own funeral as chief mourner!*

The bodies of this species of cockroach are often found with the empty cocoon of the wasp occupying the cavity of the abdomen; the young wasp, having been hatched there, and, after completing its larval stage, spinning this cocoon, still remains there to complete its development, when it comes forth a perfect insect, in all respects like its parent.

To show with what tenacity the wasp sticks to her prey when once within her grasp, we once put a cockroach, which had been paralyzed, with the wasp, in a glazed earthen pitcher, and watched the result. The wasp attempted to lead the roach out of the pitcher, to which move the cockroach made no objections, and walked up the inclined side of the pitcher as far as his feet would permit him, but not being furnished with the little pads

or suckers with which our common fly and many other insects are provided, he found it out of his power to comply with the requirements of his master, and on attempting to continue his walk, fell to the bottom. The wasp again led him up, and again he fell. This was repeated for the space of three hours, the wasp, in some of her attempts, nearly sustaining the whole weight of the roach. After being convinced of the impossibility of her accomplishing the feat, I liberated the pair, the wasp soon storing her prize away under a bookcase.

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## FISH CULTURE.

BY CHARLES G. ATKINS.

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NEARLY all of our common fishes are *oviparous*, which term, as distinguished from *viviparous*, we may apply to those species of animals which are reproduced by eggs laid in an undeveloped state. In most cases not only are the eggs extruded from the female fish before their development, but also that contact of the male element which impregnates them, and without which no development is possible, is effected after their extrusion.

The operation of spawning, or depositing and impregnating the eggs, as performed by the parent fishes, is essentially as follows. At the spawning season, mature fishes of both sexes repair to a suitable locality; and, having selected a place, the female extrudes her eggs, which sink to the bottom among the pebbles, or, if glutinous, adhere to sticks, weeds, and stones. At the same time, or immediately afterward, the male emits the milt, the fecundating element, which, diffused through the